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BIRD STUDIES IN LORAIN COUNTY, OHIO.

WINTER STUDIES.

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There is a fascination about the study of the hardy birds who brave the winter's dangers and discomforts, which no other season of the year affords. We feel not only gratitude but a sort of kinship to these our brothers in feathers who seem to refuse the comforts of winter tropics that we may not be left wholly deserted in the ice and snow for three long months. We must feel a certain respect for them, too, when we reflect that they have never a fire to warm them and to soften their frozen food. There is a constant battle with the cold. The sun is their only fireside.

The study of birds in winter, if one studies them under all conditions, is pretty sure to be attended with discomforts at times. But if we dress for the work it serves rather to increase our love for the season in what it brings of increased capacity for work, than dread for it. There is a sense of being superior to the weather, whatever the temperature, which is exhilarating and invigorating. We ought to feel the better in health for breathing air from which the moisture has been well frozen out.

Winter gives up many secrets of the birds which must otherwise be always hidden from us. It would be rare indeed that the birds which walk much should write their activities so we could read them, without snow. But about what can be read from bird tracks we are not concerned in this paper. At no other time of year do the purely social instincts of the birds show themselves so well, and can be read so easily. Birds are far more approachable than at any other time except when nesting. The nesting season, however, presents the other side of the bird nature—the egoistic or the family life as distinct from the social life. But it is not about this side of the winter study that I wish to speak now. Rather let us first see what and how many birds there are about us during the winter months.

In the deductions which follow it must be understood that they are based upon strictly winter records. Generally that means December, January and February; but sometimes winter did not begin until mid-December, and sometimes it ended a week or more before the close of February. In only one instance did it begin in November and in only one extend into March. It is comparatively easy to determine the end of winter by the appearance of the first migrant birds, but it is often difficult to know at what time the winter begins. In every case of doubt the record has been thrown out.

The work upon which this paper is based began in 1896, and has been carried on uninterruptedly every winter since. After a very little experiment it became apparent that the plan to make a complete census of even a quarter of the county was impracticable. Consequently several representative regions were selected and these were as thoroughly worked as possible. The accompanying map of a part of Lorain county will serve to show the general outlines of the ground covered. No. 1, may be known as the Chance Creek route; No. 2, Beaver Creek route; No. 3, north overland route; No. 4, Oberlin south-east route; No. 5, Oberlin north-east route. Of course other parts of the county were traversed and

studied, but far less thoroughly than these. Furthermore, the records for these five routes are so nearly the same as regards number of trips and time spent on each trip, that a fairly reliable comparison may be drawn.

Route No. 1, represents the sand-stone knoll and Chance Creek gorge region of the county, where coniferous trees are much in evidence, and where vegetation is allowed to have its own way largely, thus affording the best possible covers in severe weather. The lake shore part of this route and of the two following ones overlap somewhat and the records for the lake have been kept distinct from the inland parts of the routes. Route No. 2, is distinctively a stream gorge route, and represents scarcely anything but the Beaver Creek fauna. It is a rich fauna. Route No. 3, is just as distinctly an overland field and woods route with no stream gorge anywhere, because no considerable stream is crossed. Route No. 4, and 5, represent the field and woods region bordering the shallow gorge of the west branch of Black River. They are somewhat different, both including some of the deeper woods of this part of the county. These five routes are fairly representative of the county, at least west of the west branch of Black River and the main part of the river from Elyria to the lake.

Oberlin, the focus of these five routes and always the starting point for the day's work, lies in a plane region 250 feet above Lake Erie. Into this plane region the streams have cut their winding courses, each from a pattern of its own. Black River and its tributaries, above the junction of the east and west branches, has formed a shallow and broad gorge, in which abandoned channels have formed long narrow marshes or lagoons with more or less heavily timbered borders. Here the pawpaws flourish, forming thickets for the winter sparrows. The whole course of this stream and its principal tributaries is fringed with sycamore trees of considerable size. Wild grapes and the bitter sweet are not numerous here, but many apple orchards bordering or

wholly within the wide gorge, afford feeding grounds for many winter birds.

Chance Creek, a tributary of Vermillion River, forms a strong contrast to the river just described. Its gorge is narrow and deep, with heavily timbered, almost precipitous slopes. The more level borders of this gorge are timbered with hickory and oak, a few beach trees, besides others, and a bountiful supply of wild grapes and the bitter sweet. Orchards also border the gorge, alternating with cultivated fields. The gorge itself is plentifully supplied with red and white cedars and hemlocks, besides many species of deciduous trees. Here evergreen timber, tortuous course, and 100 feet depth combine to form an ideal protection from any winter blast. Food, also, is abundant. The many sheer precipices exposed to the sun's heat, afford snowless retreats in the worst storms. The remainder of this route to the lake shore lies across open fields and upland woods over the sandstone knolls and deserted quarries where no attempt is made to hinder the rank and tangling vegetation. No better winter residence could be imagined for the thicket-loving birds than these tangles. One cannot beat through them. Persuasion is the only successful method of dealing with the birds here.

Beaver Creek presents the characters of Black River in its upper and lower reaches, but modified Chance Creek characters along its middle third. Here one finds two small hemlock groves which afford shelter for the hawks and owls. Crows also winter here. Food seems to be abundant everywhere. A day spent along its course is sure to bring surprises.

The uplands of the county, or the parts of it studied, are a succession of four fairly level terraces to the lake shore. Except along the course of the old lake beaches the country is about three-fourths cultivated fields to one-fourth woodland. The woods are, generally speaking, the remnants of the original forest which occupy land hardly fit for the plow if it were cleared. It is either swampy, or too thin soil.

That is not true of all the woodland, however. The courses of the old lake beaches are untillable, in places, and in such places are a wild tangle of trees, bushes and vines, into many of which even the cattle are unable to penetrate. Seeds, berries and grapes abound. These stony old beaches vary in width from a few rods to many rods.

The lake shore is bordered by high clay banks except where the streams have cut an exit. The back water from the lake has caused these channels, which seem to have been considerably deeper in former times, to partially fill with wash, thus forming bogs and swamps of various sizes and considerable length, which are now largely overgrown with wild rose, a species of water willow and alder bushes, in some places forming impenetrable thickets. The annual plants grow here in bewildering profusion and astonishing rankness. This is the favorite winter retreat of Song Sparrows. The woods which border the swamp at Oak Point, the mouth of Beaver Creek, harbor the most of our woods-haunting winter species. It is second only to the stream gorges in the richness of its population.

The lake and its immediate shore furnish scarcely more than the water birds. Usually the Short eared Owl may be found hiding underneath the overhanging banks, and not infrequently Snowflakes are found on the sand or upon the railroad track which lies close by. An occasional Crow, and one flock of seven Bob-whites are found here, making their records in the sand. Late in the winter the lake shore is a pretty frigid region, and a good deal of a wilderness. Its ice-covered surface affords no feeding places for gulls and ducks.

The work of recording the species and individuals consisted simply in walking over the same ground, time after time, recording the individuals of each species as they were seen. It is usually possible to count the individuals. Even the large companies of Tree Sparrows can be made to pass a given point leisurely enough to make an accurate count possible. There is some complication, to be sure, when Jun-

coes, Song Sparrows and Goldfinches are also a part of the company. But in such a case the species of fewer individuals should first be counted and recorded, and lastly the whole company counted. Subtraction will then give the number of Tree Sparrows. A large part of the work was done in company with Rev. W. L. Dawson, during the first four years, and with Mr. R. L. Baird, during the last two. It is needless to say that counting large companies of birds can be more accurately done by two working together than by one alone.

A glance at the weather for the months covered by this study may add interest to the discussion, and perhaps offer some explanation of the fluctuations from year to year.

Temperature alone in winter probably has relatively little to do with the winter movements of birds, unless the cold is intense; but cold, attended with a blanket of snow or ice—a frequent combination—is a condition to be reckoned with. In the following summary of weather conditions during the winters, I shall lay stress upon the conditions which would cause southward movements, or later in the winter, cause the winter birds on the ground to remain, leaving the reader to infer that when nothing is said about the weather it was not of such a character as to cause any marked movements of the birds.

The winter of 1895-6 opened during the first five days of December with snow and nearly zero temperature. A warm wave followed, removing the snow. The 11th brought us nearly six inches of snow and temperature a little below zero during the night of the 13th. This snow blanket began to grow thin on the 16th, and was gone after the rain of the 18th. This winter weather had a marked influence upon the birds, which was not offset by the summer weather which continued to almost the end of the month.

There was nothing in January which materially influenced bird movements, although three mornings during the first week the temperature was near the zero mark. A marked cold wave, with below zero temperatures in the middle of

February, served only to hold the winter birds from drifting north. There was not sufficient snow to cover their food.

During the winter of 1896-7 there was little snow at first, but severe cold in the Lake Superior region during the first week in December, and snows there, drove many northern birds southward, bringing into this region the usual winter fauna at the beginning of the winter.

January, 1897, opened like spring, but became snow-bound on the 5th, and only succeeded in releasing itself on the 17th in a thunder-storm. This release was followed, two days later, by the severest weather of the winter, reaching 16° below zero on the 25th; the month closing below zero. The strong contrast between January and February induced some of the hardier birds to move northward by the 17th of February, thus closing the winter. The temperature hardly fell below freezing after the first week of February.

The winter of 1897-8 did not fairly begin before the middle of December. There was just cold and snow enough during the last days of November and the first days of December to settle the somewhat frothy bird population, but not enough to drive any birds from the north down to us. The remaining days of December caused no changes in the bird population, because there was not enough snow to cover the food, nor long continued cold.

January, 1898, presented no interesting features except a thunder-storm on the 12th. There was much warm weather, but it came too early to have much influence upon the birds south of us. Severe cold in the Lake Superior region, about the 13th and 29th, tended to hold the birds steady in this region. February began severely cold and with snow, became spring-like during the second week, and was cold, for the month, the remaining days. The winter was not severe enough to bring us any unusual birds, nor to drive the Mourning Doves and Meadowlarks south.

Winter began, 1898-9, on November 23d, with snow and cold. Snow during the first and second weeks of December, and severe cold during the second week made the birds

settle down to solid winter conditions. The warm days during the last week came too late to influence the birds. It is worthy of record, however, that their food was so abundant that the Red-headed Woodpeckers remained in considerable numbers.

January, 1899, was in no wise unusual. Warm during the first week, cold during the second, warm during the third and closing cold, with more or less snow during the month, tells its story of any lack of influence upon the birds. With February it was very different. The first and second weeks were severe in the extreme. At Oberlin the temperature was scarcely above zero any morning during the first fifteen days. Following the cold came genuine spring weather, bringing Robins and Bluebirds on the 20th, and thus closing the winter.

A snow storm on December 4th to 6th ushered in the winter of 1899-1900. Another snow storm from the 13th to 16th, and a period of snow from the 26th to the 30th completed the winter records of this month. The remainder of the month was unusually mild. There was nothing unusual among the birds. January, 1900, was a continuation of December, until the last four days brought a cold wave and snow, the storm extending well into the first week of February. There were no bird movements. February was a month of sharp contrasts, ranging from 67° on the 9th to 4° below on the 27th, with two well marked cold waves: one in the third week and one in the fourth. There was no movement of the birds northward until March 7th.

The winter of 1900-1 began with snow in the north on November 12th to 15th, driving some birds southward at that time, but winter weather did not prevail in this region until December 13th, which was the culmination of the first real cold wave. The month presented no marked features.

January, 1901, opened with a crusted snow covering the ground, causing the absence of the carnivorous birds, except the owls. Mourning Doves were forced south by this complete blanket upon their food supply. For the rest of the

month, and for February, the temperature fluctuated between 56° at noon of January 10th and 3° on the mornings of February 23 and 28, but with no decided fluctuations of cold and warm waves. Snow covered the ground during the larger part of the month, arresting any tendency to northward movement before the end of the first week in March.

The winter 1901-2 was in a hurry to begin. Snow storms on November 5th and 6th, 13th to 17th, 19th and 23d, in the Lake Superior region, aided in the early beginning of winter conditions here. The winter birds were practically established on a winter basis early in November. Continued cold in the north region, combined with below zero temperatures here in the middle of December and on the 21st, brought about unusual occurrences in the bird world. Clearly the appearance of the Pine Grosbeak and White-winged Crossbills was due to this early severe weather and snow. January, 1902, was not peculiar, except for the absence of the regulation thaw, and the consequent almost continuous cold weather.

From the foregoing account of the weather conditions it will be seen that but one of the winters treated began early and continued wintry with little intermission, if any, and that this winter was the only one during which there were distinctly notable happenings in the way of the influx of the far northern species. It may be fair to infer that given similar conditions again there would be similar results.

The actual time covered from which these records are taken is January 1st, 1896, to January 15, 1902; during the winter season, of course. But the year 1896 does not figure in the court of individuals of the several species, because very meagre records of the individuals were kept during that year. Likewise, only the months of January and February, 1900, count in that year, because nothing was done during December, 1900.

Taking, then, one-half of each of the two winters represented in a single year, the number of species for each year stands as follows: 1896, 19; 1897, 36; 1898, 40; 1899, 35; 1900, 30;

1901, 42. And for the first fifteen days of 1902, 35. The number of trips taken during these years is as follows: 1896, 9; 1897, 11; 1898, 12; 1899, 10; 1900, 5; 1901, 14, 1902, 5. The number of species seen during this time reaches the rather startling number 65. That is fully one third as many as have ever been recorded during any entire year and is nearly two-fifths of all the species recorded for the county.

A more accurate record would include a single winter during which the conditions of temperature and weather and the food supply, would be far less variable than during parts of two winters. The records follow: 1896, 19; 1896-7, 37; 1897-8, 35; 1898-9, 41; 1899-00, 32; 1900-1, 34; 1901-2, 42. The trips for the corresponding times were: 1896, 7; 1896-7, 7; 1897-8, 13; 1898-9, 12; 1899-00, 8; 1900-1, 9; 1901-2, 10. Of course there were some records made without any definite effort to get away from the village.

Comparing the five routes to determine which is richest in species, we find that during the time covered by the study there have been seen at Chance Creek, 39 species; Beaver Creek, 35; north overland, 22; south-east, 30; north-east, 32; while 12 have been recorded on the lake and 11 within the limits of Oberlin. The average number of species recorded for each of these five routes gives a slight advantage to Beaver Creek over Chance Creek, and a decided advantage to the stream gorges. Chance Creek, 20; Beaver Creek, 21; north overland, 17; south-east, 15; north-east, 14. One might expect the south-east and north-east routes, to be richer than the north overland route; since they touch the Black River gorge, but the old lake beaches more than compensate for any advantage that the shallow gorge might offer. The route is a longer one, also.

This comparison clearly proves the greater richness of the steep sided and deep stream gorges in species which regularly live there during the cold weather. The records for a series of years also prove that more species not regularly found in the county in winter resort to the stream gorges

when they do visit us. There is this to be said, however. During mild weather, especially when the ground is not covered with snow, fewer species are to be met in the river gorges and more of them are scattered over the uplands. The protection which these gorges offer is clearly the influence which calls the birds to lodge there. Other things being equal, food is more abundant and easier to get upon the uplands.

Let us turn, now, to the numbers of individuals which are more or less regularly found along these five routes during the winter days. It will not be interesting to treat each of them separately, but rather give the totals for all of the routes, with the deductions that may follow. In these totals of individuals let it be understood that they are *averages* for the five years of study, of all of the notes taken together ending January 15, 1902. For some of the more unusual resident species this amounts to a pretty accurate census, since they are found in a few localities only, but with those species which range over considerable territory in their quest for food, it is merely an average of those recorded during the several trips. It is useful as a guide to the haunts of the species, and serves to illustrate the relative abundance of the species as compared with others. The species, with their average numbers and a few remarks upon their mode and places of occurrence, follow.

American Herring Gull, 17; found on the lake only.

American Merganser, 10; on the lake only, and usually absent in late winter.

Red-breasted Merganser, 4; see the last species.

Mallard, 3; on the lake, and rather irregular in winter.

Old-squaw, too variable to assign numbers. Sometimes many winter on the lake.

Ruffed Grouse, not seen for three years, formerly found at Chance Creek.

Bob-white, 95; a small flock in almost every brushy pasture. Increasing.

Mourning Dove, 11; found near barns or where barn manure is scattered.

Marsh Hawk; irregular near the lake. One usually seen every winter.

Cooper's Hawk, irregular, but usually recorded during the winter.

Sharp-shinned Hawk; the records show but one each winter near woods. It is probably more numerous than the record shows.

Red-tailed Hawk, 7; almost anywhere over woods and streams.

Red-shouldered Hawk, 11; like the last but more frequent.

Broad-winged Hawk, 2; usually near the lake, but irregular.

American Rough-legged Hawk, 2; like the last. Usually flying over fields.

Bald Eagle, 2; the two usually in the vicinity of a nest near the lake.

Golden Eagle; twice seen in winter at the lake shore.

American Sparrow Hawk, 19; more frequent at the lake, but seen hovering over almost any field.

Pigeon Hawk, 3; always happened upon, usually when flying.

Barn Owl; one died in a barn near Oberlin.

Long-eared Owl; scarce. A colony of six recently found in a deep gorge tributary to Black River.

Short-eared Owl; one or two usually found at the lake shore. Occasionally seen inland also.

Saw-whet Owl; recorded only for Oak Point on the lake shore.

Barred Owl, 5; these five have regular dwelling places—two at Chance Creek, one in a wood north of there two miles, one in the south woods near Oberlin, and one in a wood south of North Amherst. Outside of these five routes there are at least five others known.

Great Horned Owl, 2; one in the south-east route, one in the north-east.

Screech Owl, 3; confined to Oberlin village so far as known. One has been recorded several times from the north-east route, and one in Chance Creek gorge once.

Hairy Woodpecker, 29; found wherever the troops of small winter birds are. That means in woods or weedy fields.

Downy Woodpecker, 70; like the last, but far more numerous.

Red-headed Woodpecker; not a regular winter resident. When it does remain it resorts to the deep woods, and is numerous there.

Red-bellied Woodpecker, 14; found in nearly every considerable woods.

Flicker, 13; generally distributed, frequently in towns, and about farm houses.

Prairie Horned Lark, 104; Horned Lark, 46. These two forms are scattered over the fields when there is no snow, but resort to the fields where barn manure is scattered when the land is snow bound. They are at the lake shore also.

Blue Jay, 50; pretty generally distributed, but more numerous in woods.

American Crow, 30; more frequent in stream gorges and in the vicinity of the slaughter houses, or where stock is fed.

Meadowlark, 26; more numerous at the lake shore, but in many sheltered fields.

Rusty Blackbird, one female was taken at Oak Point February 13, 1897.

Bronzed Grackle; one has been seen in Oberlin all winter for four years.

Pine Grosbeak; one found at Chance Creek, Jan. 1, 1902.

Purple Finch, 28; almost wholly confined to the stream gorges in winter. Once in woods near Oberlin.

American Crossbill; irregular, but recorded for Oberlin and Chance Creek.

White-winged Crossbill; six found feeding on hemlock cones on Black River Jan. 4, 1902.

American Goldfinch, 193; the flocks are generally large and range almost anywhere, but are more often seen in the

deep woods and stream gorges. A few scattering individuals are not infrequently met with anywhere.

Pine Siskin; irregular as a winter resident. Often with Goldfinches, or in flocks of few to many individuals in river gorges.

Snowflake, 20; usually found after severe north-west storms, in fields.

Lapland Longspur, 10; this and the last species are generally found with the flocks of Horned Larks, seldom by themselves.

Tree Sparrow, 600; this number is given to indicate that this is by far the commonest winter bird. The flocks are found in every woods and in many fields. Between Oberlin and lake Erie, in any direction, there are probably a thousand Tree Sparrows.

Slate-colored Junco, 106; almost invariably with the Tree Sparrows, but far more often in the stream gorges. The number given is an average of those actually recorded, and fairly represents the proportion to Tree Sparrows.

Song Sparrow, 33; one or more in almost every grass-grown thicket. More numerous in the lake shore swamps than elsewhere.

Cardinal, 30; largely confined to the stream gorges. Until the present winter usually found in nearly all considerable woods in twos and threes, but now they seem to be gathered in large companies in or near the stream gorges. 1902 has thus far yielded 25 for Chance Creek and 23 for Black River. An evident increase.

Cedar Waxwing, 52; likely to be seen anywhere, but more often at Chance Creek.

Northern Shrike, 4; this is a census. One near Oberlin, or in it, one on Black River below Elyria, one on Beaver Creek at South Amherst, one near the lake shore north of Chance Creek.

Carolina Wren, 3; another census. One at Chance Creek, two south of North Amherst in Beaver Creek. Only

recently arrived in the county. There may be another below Elyria on Black River.

Winter Wren; one recorded in Ely park at Elyria.

Brown Creeper, 6; there is probably one or more in every large woods, and from one to four in each stream gorge. The number given represents only those actually recorded.

White-breasted Nuthatch, 50; in all woods and in town. Undoubtedly this is a low estimate for this species.

Red-breasted Nuthatch, 3; one at Chance Creek, one on Black River below Elyria, one at Oak Point. Others are likely about.

Tufted Titmouse, 48; in almost every woods. Probably more in winter.

Chickadee, 70; more generally distributed than the last. Common in town.

Golden-crowned Kinglet, 10; recorded only for Chance Creek, Black River and Oberlin. Probably more numerous.

Robin; one regularly winters in Oberlin.

Bluebird; one or more found every winter of the study, usually in Oberlin, but there is one record for Chance Creek.

To this list must be added two accidental records.

Horned Grebe, one found on the streets of Oberlin in an exhausted condition, its gizzard crowded full of small rubber bands. It died.

Brunnich's Murre, four captured at Lorain, December 25, 1896, by Mr. A. Hengartner.

Others than these might be recorded, but their occurrence would not fall within the limits set.

Eliminating, for the purpose of determining the census of the region covered, all but the species which are regularly found every winter, or almost every winter, there remain fifty species. Among these fifty there are several whose numbers can be pretty accurately given for the ground covered by these five routes, because they are confined to known places. These are:

American Herring Gull, 17; on Lake Erie only.

Bald Eagle, 2; at their eyrie near Oak Point.

Great Horned Owl, 2; in two deep woods, southeast and northeast of Oberlin.

Bronzed Grackle, 1; in Oberlin.

Northern Shrike, 4; as already given.

Carolina Wren, 3; as already given.

Robin, 1; in Oberlin.

Of the remaining 44 only averages for these five routes can be given. But the work done outside of these routes proves that they are fairly representative of all of the territory covered, and so represent the average bird population for any given region of like extent in this part of the county. There is little reasonable doubt that the whole county is also fairly represented in this region. There may be deeper and more extensive woods in the eastern part than we know here, but there is certainly not more coniferous timber, nor more favorable places for a large percentage of the birds.

It is needless to say that there is here no basis for any sort of an estimate of the whole bird population of the county. All that can be said is that anywhere in the county one might expect to find an equal number of birds under equal conditions. The territory covered is far too little in proportion to the whole to state more than this. But there is one important consideration which this censo-horizon work leads to. It is the possibility which it holds out for a solution of the perplexing question of the meaning of the commonly used terms "common," "rare," "abundant," etc. It affords a basis for assigning definite values to these terms. But that is a task far too great to be adequately considered as an incidental part of another paper. It is deserving of a separate paper, which I hope may be forthcoming at no distant day. Until these wholly indefinite terms can be given some definiteness, can they be used to convey any intelligence to others than those who personally know the region spoken of.

The smaller land birds, at least, are gregarious to a greater or lesser extent. Some are naturally gregarious within the

species, some within the families, as the Icteridæ, or black-bird group. Sometimes this instinct is hardly apparent, but with some species it is very marked, the birds of a species even nesting in communities. It is, perhaps, suggested in the species which usually show faint traces or none, by the community of interest exhibited at the call of distress from any bird. In the winter this faint instinct shows far more prominently than at any other season with the birds as a whole. Then the smaller woods birds habitually go in troops or companies. Some species are habitually found together, or found in these troops, while others are more independent and wander from the troop when occasion seems to demand. It must not be supposed that when I say that some species are habitually found together that therefore they may never be found alone. That would be carrying the statement over into the impossible, but it is true that certain species are rarely separated in the winter months. It is also true that these same troops of species are the leaders of troops during the height of the spring warbler migration. The point I wish to make is, that birds are not, as a rule, scattered helter-skelter about any region. They are more evenly distributed over any given region during the period of nesting than at any other time.

The species which almost always form a bird troop in winter are as follows: Chickadee, White-breasted Nuthatch, Tufted Titmouse, Downy Woodpecker, Hairy Woodpecker, Blue Jay. With these are often associated the Red-bellied Woodpecker, Flicker, Song Sparrow, Cardinal, Tree Sparrow, Junco, Goldfinch, Red-breasted Nuthatch and Brown Creeper. Still rarer species which may be attracted by the food rather than by a desire for company, may be mentioned: Cedar Waxwing, American Crossbill, Purple Finch and Pine Siskin. All of these are woods birds. Out in the fields we frequently find the Horned and Prairie Horned Larks, Lapland Longspur and Snowflake, in companies. Such species as the Crow, Meadowlark, Mourning Dove, Bob-white and the water birds, are naturally gregarious

within the species, during the winter, but the different species are seldom found together. The birds of prey and Northern Shrike are essentially solitary in habits. Bluebirds and Robins are found as solitary individuals simply because they are so rare as winter birds.

It is clear, then, that to be successful in the winter study of birds one must know something of their favorite feeding places before they can be found at all. In extreme weather they seek protected places, just as you would if compelled to pass all of your time out of doors—indeed, just as you do when you step out of the storm into your home and the comforts of the fireside. I sometimes think that we make too hard work of our bird studies. By inquiring what we should do if we were forced to live the life of the bird, we shall not go far wrong in our interpretation of bird life. Of course we should not reason out what it might be ultimately best to do, but what the first impulse dictates. Birds are the most impulsive creatures living.

Undoubtedly one of the great determining influences upon the local and general distribution of birds, since they are able to travel so easily and so far, is the food supply. Birds are great eaters, because they live so fast. A fever heat temperature requires a large amount of fuel. That is why the birds are feeding all day long in winter. Of course they will go where the food is the most abundant, or where it is obtainable with the least effort. Usually that will be in some sheltered place for the woods birds, but may be an exposed place for the field birds. But since field birds feed upon the ground very largely, they will not be greatly exposed to cold winds there. When such a bird must feed in a strong wind it will invariably turn facing the wind. The other way its plumage would be blown away from its body and so expose it to the full force of the cold. Heading into the wind becomes pretty nearly a necessity in winter.

In the most severe weather, or when the country has become snow-bound for a considerable time, the Crows, Mourning Doves, Meadowlarks and the two forms of Horned Larks,

may be forced into the barnyard for food. Twice the Horned Larks have braved the dangers of civilization and come to the heart of town to glean there. Food they must have, or die.

It may be interesting to give a list of the species which may be found within the limits of Oberlin during some time in the winter, not every winter, perhaps, but during a series of years. The most noticeable one, not to mention that vermin, the English Sparrow, is the Blue Jay. It is on hand in any weather, if you have a kitchen scrap barrel or box. Next is the Downy Woodpecker, closely seconded by the Hairy Woodpecker. Every cold morning one greets me (one of each species) when I am cleaning the walk. Several live on the college campus and in the adjoining trees. Less commonly with them may be seen the Chickadee and White-breasted Nuthatch, usually quiet on cold days, except for that strenuous little chip, while searching for the frozen morsel. Occasionally a Sparrow Hawk or a Northern Shrike come to town, where the sparrows are such easy prey. I have already spoken of the Horned and Prairie Horned Larks coming in during cold, snowy weather. One old Flicker lives in the cupola of Council Hall and forages in the adjoining orchards and back yards. In the neglected back lots Song Sparrows, Tree Sparrows, Juncos and Goldfinches may be found helping some one about next season's gardening. One old Bronzed Grackle and one old Robin refuse to leave the classic village even in the coldest weather. They forage in back yards for a living. A Bluebird pays occasional visits. A Tufted Titmouse or two is sure to pay a call before the close of winter. At least three Screech Owls live about town, known by their wooing all winter long. Once a Mourning Dove and once a Meadowlark ventured into town during December. The Meadowlark rested in a treetop in the midst of the campus. The Red-tailed and Red-shouldered Hawks pass to and fro over town, but I have not counted them. One Horned Grebe was found exhausted on Prospect street in December. Golden-crowned

Kinglets feed in the evergreen trees on the campus and about town all winter. A Brown Creeper has made the college campus his feeding ground this winter. One flock of a dozen Bob-whites ventured well within the settled portion, for no apparent reason, unless their ancestors owned that particular spot by right of long occupation. Crows have frequently passed over within easy range. American Crossbills and Cedar Waxwings are irregular winter residents.

A question that I have often asked myself may occur to others. How is it that the birds pass over the same field, or even small area of weed tops, again and again during the winter, evidently finding something to eat each time? Or, in another way, why don't they clean each weed head up before going to another? One could not watch a company of Tree Sparrows for five minutes without discovering that they merely nip here and there as they pass along, without the intention of making an entire meal at any one place, however abundant the food. There appear to me to be two reasons for this conduct. First, in cold weather they must keep moving or freeze. Second, they want variety. Neither would be true of the flesh-eating birds, both because they are larger and therefore have greater resistance to cold, and because they bolt their food and digest it without grinding. They seldom feed upon frozen food, as the smaller birds must. In the cold weather the smaller birds keep moving all day long, or else seek some sheltered place where a degree of comfort is possible, and all the while they are feeding, now upon this, now upon that sort of food. Even the woodpeckers don't stop to dig long in one place.

If movement is necessary to life in cold weather, how can the birds sleep? Just like any other animal, I suppose. They seek out some sheltered place and curl up. The woodpeckers and other birds which nest in holes in trees sleep there in winter. The sparrows and other birds which build nests in bushes or trees or on the ground, find shelter among the dried foliage of last season, or among the grass on the ground, or even under the snow. Many times have

I startled the Horned Larks and Longspurs from their snow beds, early in the morning. With a little volcano of snow they burst through the slight crust, vaulting into the frosty air, only to dive beneath the snow again, just beyond harm's way. This burrowing habit of the Prairie Chickens is well known to all who hunt. The hawks seek out some dense evergreen, or oak from which the brown, dry leaves have not been torn. The owls do the same, or crawl into a hollow trunk.

Why don't birds' feet freeze, I have often been asked. They do, sometimes. There isn't much about them to freeze but skin and tendons. The skin is a horny sort of skin, and the tendons are tough. Such material does not freeze readily. When the birds squat, as they do when perched, the feathers form a warm blanket for the feet and legs. A hungry bird, I mean one which has fasted long, is an easy prey for the frost. A bird's vitality is much more quickly sapped by fasting than ours is, as they are faster liver than we are. But for their covering of feathers, the warmest possible garment for its weight, none could hope to survive the rigors of our northern winters.

I have spoken of the few Bluebirds which remain with us all winter. Ten years ago no Bluebirds were ever seen in winter in the county. During that phenomenal winter of 1894-95, when the South was swept by such a cold wave that the orange trees in Florida were destroyed, and Tennessee suffered one of the severest weeks since the Civil War, the Bluebirds which had gone into that warmer region to winter, were all but exterminated. They had wintered in that comparatively warm region for so many generations that when the severe cold did come they were unable to withstand it. But the comparatively few individuals which tarried in southern Ohio were able to live through even severer weather, and it is the descendants of that hardier race which find northern Ohio bearable now.

What do the birds eat when everything is covered with snow and ice? That depends upon the bird. The large

flesh-eating birds must have flesh, and the grain-eating birds, including the sparrows and Bob-white, and the Ruffed Grouse, of course, live on vegetable matter. It is hardly going beyond the facts to say that the smaller insect-eating birds will take anything that can be found. The woodpeckers eat large proportions of seeds and other vegetable matter, in winter, and so do the nuthatches, and tit-mice. The Brown Creeper may not eat vegetable matter. Crows and jays eat anything. In the severest weather, when the north of Ohio is covered with snow but the southern part is free from it, or nearly so, as sometimes happens, the birds of prey go to the less snowy regions and remain until there is a change, food being easier to obtain under such conditions.

If there is one lesson which the study of birds in winter teaches more than another, it is that there can be no hard and fast line drawn in respect to what birds will eat when their ordinary food is hard to get or wholly wanting. Birds that are supposed to subsist wholly upon insects or similar food, will take large proportions of vegetable food in winter. The soft inner bark of many trees furnishes a never failing supply of food for some of the woodpeckers at least. One needs to think but a moment to perceive that one of the essentials of a bird whose residence is in a northern region for the whole year, is the ability to adapt itself to the conditions, which are certain to be variable. Winter bird life is but one of the chapters in the story of the development of the intensely interesting class—Birds.